The following explanation of the reaction occurring during the immersion of the collodionised plate in the nitrate bath is given at p. 41: "The salts of iodine and of bromine that exist in the collodion film change their *properties* with nitrate of silver and give birth to iodide and bromide of silver and to *nitric acid salts*." The italics are our own. On p. 70 a footnote is added to explain that "1 gramme = the 1,000th part of a cubic metre, about nine solid feet of water at the ordinary average temperature."

Under the head of "Operation of Light on the Elements," which commences on p. 107, we find that chlorine is "a greenish strong-smelling gas developed from chloride of lime," that bromine "is an unpleasantly smelling substance of a fluid nature," and that iodine is "a black substance also of a fluid nature and used for friction." "Sulphur unites with oxygen and produces the pungent strong-smelling sulphuric acid;" "chloride and bromide gas show a peculiar relation to light even in their combinations;" and lastly, iodine again appears as a "solid body appearing in the form of shining black crystals, and emitting, when heated, a wonderful violet vapour."

Under the head of "Chemical Effects of Light on Salts of Silver," chloride of silver forms a "cheesy" precipitate; chloride, bromide, and iodide of silver are "very tenacious bodies;" when chloride of silver is exposed to light, the "chloride is liberated, and disappears as a greenish gas, which, from its abundance as well as its odour, can be perceived to be chloride of silver." "Green vitriol is greatly attracted by oxygen, and taking it up readily, passes into sulphate of iron."

On p. 118 we have the following lucid description of the toning process:—"The positive prints are subjected to a further treatment styled the colouring process. To this end it is plunged in a very diluted solution of gold. This solute (*sic*) contains chloride of gold. Metal silver has more affinity with chlorine than gold; hence it combines with the chlorine, forming chloride of silver, while the gold is precipitated. It becomes separated in the shape of a blue colour, adhering to the outlines of the picture, and this blue, mixed with the brown of the picture, gives a pleasant tone which does not change in the fixing-bath, that is, in hyposulphite of soda." The latter body is, by the way, alluded to indifferently as hyposulphite of soda, "fixing sodium," and "fixing natrium."

In photographic apparatus the translator is equally at sea. A dark slide is continually spoken of as a "cassette," and a printing frame as a "copper frame." The technical names of the processes are also as a rule incorrect.

We have no patience to devote more time to this wretched translation, which is only passable in portions of the part on the physics of some of the photographic processes.

While Dr. Vogel is held to blame for a prolixity and discursiveness which, together with the childishly elementary character of much of the work, render it very dull, the editors of the "International Scientific Series" must be held responsible for still further reducing the value of the work by employing a translator ignorant of the subject.

R. J. F.

OUR BOOK SHELF

Ornithological Miscellany. By George Dawson Rowley, M.A., F.Z.S., Member of the British Ornithologists' Union. Part I., No. I. January 1875. (London: Trübner and Co.)

THE first number of Mr. Rowley's "Ornithological Miscellany" is devoted to the illustration of some of the rarer birds of New Zealand which have lately come into his collection. The most interesting of these is perhaps the large spotted Apteryx discovered by Mr. Potts in 1873, and named after Dr. Haast, of which, we believe, Mr. Rowley's specimens are the first that have reached this country. Figures of and remarks on the other known species of Kiwi are also given, so that we have altogether a nearly complete account of what has yet been ascertained respecting the external form and habits of these singular birds. Mr. Rowley passes on to discuss the structure of the feathers of the Struthious birds, of which he also gives us some admirable illustrations. A glance at these will serve to show how very far removed in many essential points is the genus *Apteryx* from the Cassowaries and others of the order *Struthiones*, with which it is commonly associated. Finally, Mr. Rowley gives us an account of a white variety of one of the Nestor parrots of New Zealand, which, as all birds are subject to the occasional influences that produce albinism, is not, perhaps, after all, of special interest; but Mr. Keuleman's well-drawn figure of this bird will be appreciated by all ornithologists.

Such are the contents of Mr. Rowley's first number. In regretting that he does not know when the next will appear, or what it will contain, we fully sympathise with the author. But if Mr. Rowley can produce from his cabinets a similar series of rarities to figure, and find an equally good artist to draw them, we are sure that his second and following numbers will meet with equal appreciation from every lover of natural history.

On Numerals in American Indian Languages, and the Indian Mode of Counting. By J. Hammond Trumbull, LL.D. (Hartford, Connecticut, 1875.)

FROM a careful examination of the numerals in various North American languages, Dr. Trumbull adds some interesting evidence to that already available as to the native development of arithmetic among uncultured races. The derivation of numeral-words from the names of the fingers habitually used in counting numbers is well shown in Hudson's Bay; Esquimaux *eerkitkoka* = "little finger" being used as a numeral for 10, while *mikkeelukkamoot* = "fourth finger" signifies 9. Other materialistic sources of numeral-words are apparent in the Micmac language, where *tabu* = "equal" has become a numeral for 2 (like our own word "pair," from Latin *par*), while *tchicht*, which means 3, may have originally meant "more" or "again," and been used to distinguish the plural as beyond the mere dual (compare Latin *trans* and *tres*). As in the civilised Old World languages with which philologists especially occupy themselves, the numerals have for the most part lost the traces of their original significance, their development, a not unimportant part of the intellectual development of mankind, has to be learnt from investigations like the present into savage or barbarian tongues.

E. B. T.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

British Rainfall, 1874

I AM much obliged by your favourable mention (NATURE, vol. xii. p. 76) of my annual volume, and am very glad to find that it concludes with a suggestion, because, to quote from p. 138 of

the work under notice, "We always receive with pleasure suggestions for the improvement of this publication, and within reasonable limits never allow either trouble or cost to prevent the adoption of all which in any way commend themselves to our judgment."

Your suggestion is as follows :—

"The publication of the monthly as well as the annual amounts of rain for the whole of the 1,700 stations is very desirable, and it is hoped that in an early issue of the 'British Rainfall' it will be done."

I shall be glad if you will allow me to supplement the data which were before you when the above paragraph was written by some other facts, and to learn from your pages whether or not this fuller information induces any modification of your views.

As I (whether fortunately or unfortunately I need not say) have to pay my own printer's bills, I always keep them as low as possible ; hence, the publication being an annual one, statements made in one volume are rarely repeated in the next. Therefore, probably, your reviewer was not aware of the principles upon which the tables of monthly rainfall (pp. 140–145) are compiled, viz., to give one station in every county in the British Isles, and two in a few of the larger ones, such as York, Inverness, and Ross. I may add *en passant* that these tables give the monthly fall at 108 stations, while the Registrar-General of England is satisfied with forty-four, and of Scotland with fifty-five ; so that my table exceeds both together. That, however, is of little moment. [For your own information, I enclose a map with these 108 stations plotted.]

In the next place, I must refer to "British Rainfall, 1871," pp. 135–138, where the question of publishing additional monthly returns is discussed at length, and the method of computing the monthly fall from the percentage tables (which are given every year) is explained and illustrated by a completely worked-out example.

To this let me add that returns from 150 other stations are published monthly in my *Meteorological Magazine*, and that up to the present time another very large series (143) has been printed biennially in the Reports of the British Association.

If it is the opinion of yourself and of others competent to judge that still more is necessary, more shall be done ; but it must be borne in mind that the accurate (and without accuracy figures are worse than useless) printing of 20,400 values involves a great expenditure both of time and of money. I do not quite know whence either the one or the other is to be obtained.

G. J. SYMONS

[It was just because of the inadequacy of one station in each county of the British Isles, and two in the larger counties, to represent the rainfall, even though these be supplemented by Mr. Glaisher's forty-four stations, the Scottish Meteorological Society's two hundred odd, and by Mr. Symons himself in his Magazine and in the British Association Reports, that we stated it to be very desirable that the monthly as well as the annual amounts of rain for the whole of the 1,700 stations were published. The method of computing the monthly fall from the percentage tables referred to in "British Rainfall, 1871," pp. 135-138, does not supply what is desiderated. It is the capriciousness of the distribution of the rainfall and its important bearings on many practical questions which render so desirable a knowledge of the actual monthly amounts in particular localities. Since what is desired would be an invaluable contribution to British Meteorology, we earnestly hope that Mr. Symons will be induced to supply it, and that in that case he will receive substantial support in carrying on a work so important.]

Equilibrium of Temperature in a Vertical Column of Gas

I OBSERVE that Mr. R. C. Nichols, in his letter to NATURE (vol. xii. p. 67), admits that the mean energy of molecules "*may*" remain the same at all points of a vertical column. It is not difficult to show that it *must* do so if the velocities are distributed among the molecules according to the exponential law.

As I have never seen any direct proof of this in English I extract the following from Boltzmann.

In order not to take up too much of your space, we will take the simplest case, and suppose the molecules to be equal elastic spheres, moving in a vertical tube with elastic base and sides. Let them be acted upon by vertical forces, the potential of which at height x above the base is $f(x)$. Assume first that no encounters take place between the molecules, and let the number of molecules at the base, the energy of whose vertical velocity is v^2, be $C\epsilon^{-\frac{v^2}{k^2}}$ where C and k are constants. For each molecule the sum of the potential and kinetic energies is constant.

And as the horizontal velocities are constant, it follows that for each molecule the sum of the potential energy and the energy of vertical velocity is constant. That is, the energy of vertical velocity is diminished by $f(x)$ in the ascent from the base to x.

Therefore the molecules which at height x have u^2 for energy of vertical velocity are the same identical molecules which at the base have $u^2 + f(x)$ for energy of vertical velocity.

Their number is therefore $C\epsilon^{-\frac{u^2+f(x)}{k^2}}$ that is $\epsilon^{-\frac{f(x)}{k^2}} C\epsilon^{-\frac{u^2}{k^2}}$.

Therefore the number of each class at x is the same as the number of the same class at the base multiplied by the factor $\epsilon^{-\frac{f(x)}{k^2}}$

Evidently the mean energy is the same at all points of the tube, and the density only varies, and is represented by $\epsilon^{-\frac{f(x)}{k^2}}$.

Again, still precluding encounters, let the velocities of the molecules in each of two horizontal directions at right angles to each other be distributed according to the same law as the vertical. And further, let the chance of a molecule having given horizontal velocity in either direction be independent of its velocity in the other horizontal direction or in the vertical. The same distribution and independence will be maintained throughout the tube. And we see that force has no tendency to disturb it.

Maxwell has shown that among such molecules as we have supposed encounters have no tendency to disturb the given distribution, which must therefore remain undisturbed though force and encounters both be present.

S. H. BURBURY

Primine and Secundine

WILL you allow me to avail myself of your pages as a means of pointing out to those who have purchased the English edition of "Sachs's Text-book of Botany" an unfortunate error which Prof. Oliver has been so good as to point out to me?

On p. 501 the inner coat of the ovule is identified with the "Primine" of Mirbel, and the outer with the "Secundine." The application of these terms is exactly inverted. The confusion easily arises from the fact that the secundine is developed *first* and the primine *second*. Mirbel, however, ignorant of, or disregarding that fact, numbered his structures from without inwards. The outer coat he termed the primine, the inner the secundine, the nucleus the tercine, and so on to quartine and quintine.

Except for the sake of accuracy the matter is of no essential consequence. Those who study the coats of ovules may well be indifferent to Mirbel's perplexing terms. But in these days, when students are expected for examination purposes to know about the names of things rather than about things themselves, it might lead to deplorable consequences, of which I hasten to relieve myself of the responsibility.

W. T. THISELTON DYER

American Indian Weapons

IN Col. Lane Fox's Catalogue of his Anthropological Collection he quotes Schoolcraft as saying, "There is no instance amongst the North American Indians in which the war-club employed by them is made of a straight piece, or has not a curved head." I send you a drawing (Fig. 1) of a club in common use among the Numas, or Indians of the Great Interior Basin, embracing Shoshones, Utes, Pueblos, &c., which will no doubt interest Col. Fox and others, not only on account of its extreme simplicity of form, but also of its method of use. It might be called appropriately a "face-masker," being grasped with the bulb next to the little finger, and thrust into the countenance of the foe. Major Powell sent a number of these to the Smithsonian Institution. They are of one piece of wood, generally mezquite, either very rude or quite smoothly polished, and are worn attached to the wrist by a leather thong. They vary in length from eight inches to fourteen. These same tribes use a simpler "slung shot" than the one described in Col. Fox's Cata-